APPROVAL SHEET
FOR ANTENNA

CUSTOMER: xiaomi

FA-MAIN-SZ0204
FA-DIV-SZ0205
AAC P/N: FA-3IN1-SZ0206

CUSTOMER P/N: C3S_L Antenna

CUSTOMER	APPROVER	CHECKER

AAC ACOUSTIC TECHNOLOGIES HOLDINGS INC.

Add: AAC Technology Building, NO.18., Xinxi Road, North Hi-Tech Industrial Park, Nanshan District, Shenzhen, P.R. China 518057

Tel : 0086 755 26054538

AAC ELECTRONICS CORP.	Product Specification	P/N	FA-MAIN-SZ0204

Main antenna:GSM850/900/1800/1900,WCDMA B1/2/4/5/8,FDD-LTE B1/2/3/4/5/7/8/28,TDD-LTE B38/40/41;

NO. 0	Issue: x4	Revision Date: 2022/6/15	Page: 1/24

ME	张明	Check/Appr.	
Package Eng.			
RF	王啊琦	Check/Appr.	

Date	Issue	Detail changes
2022/6/14	x4	Preliminary

Table of contents

1. Scope

This document contains required environmental,electrical characteristic, mechanical, package and reliability test requirements.

2. Environmental Requirement

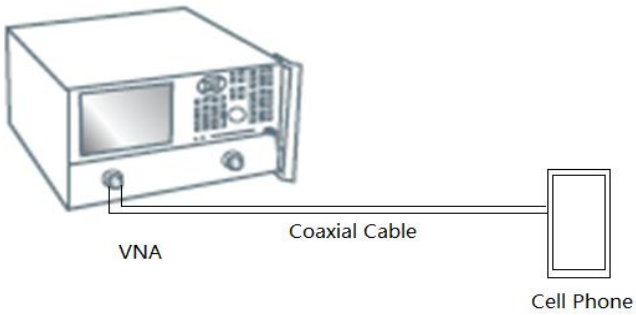
all components must be free from lead (Pb) and other banned or restricted substances according to customer's requirements.

3.Electrical Characteristic Measurement Method

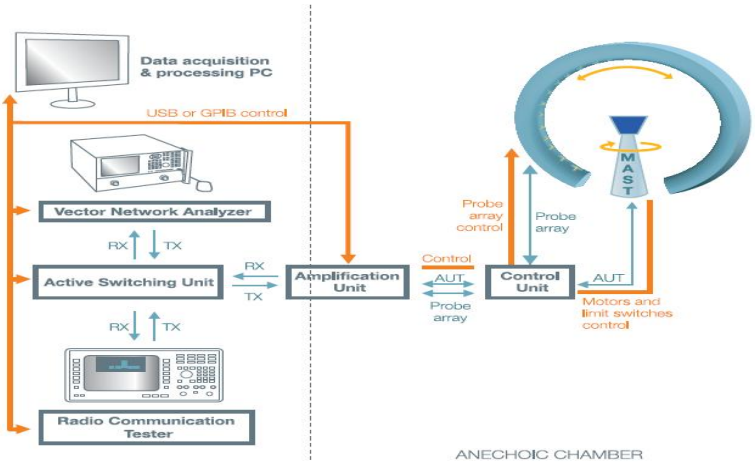
3.1 Measurement method

To measure the Return Loss and VSWR, Smith Chart, Vector Network Analyzer Agilent E5071C was used. Satimo SG24 Anechoic chamber was used to measure the Efficiency, Gain, TRP and TIS.

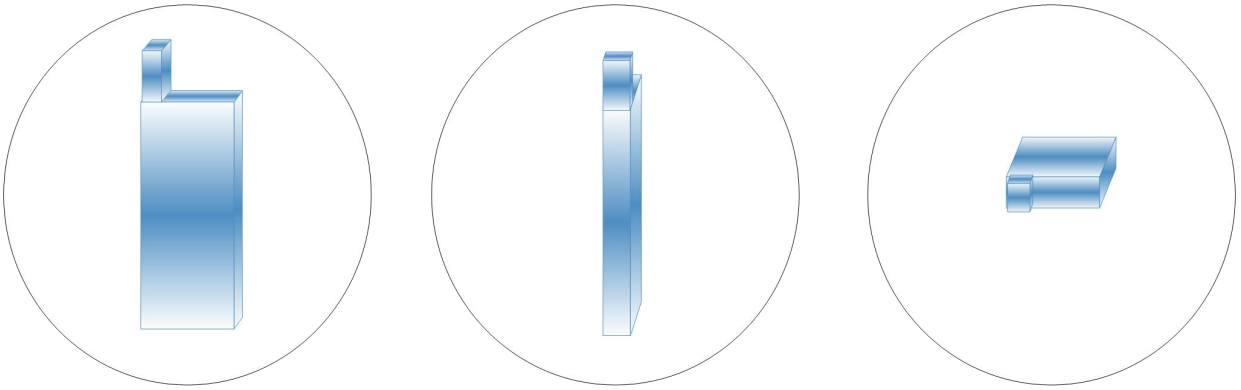
3.1.1Return Loss and VSWR



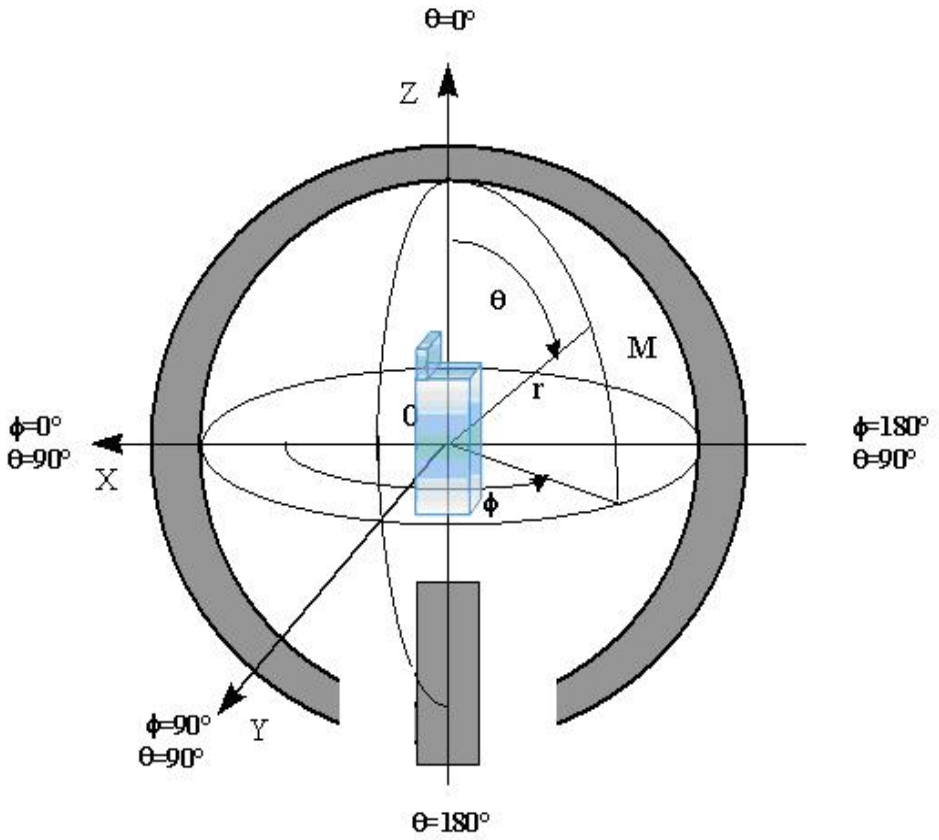
3.1.2 Efficiency, Gain, OTA measurement



3.1.3 Cutting plane and polarization

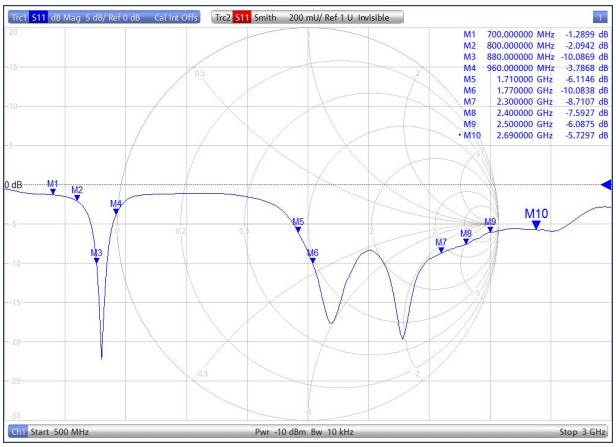


Phi=0deg Phi=90deg Theta=90deg

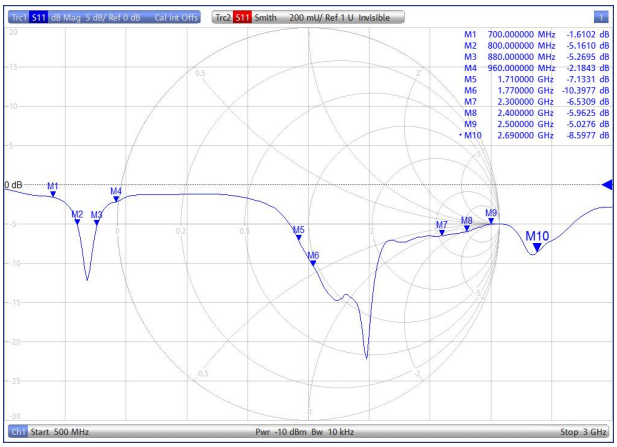


6.Passive Measurement Data

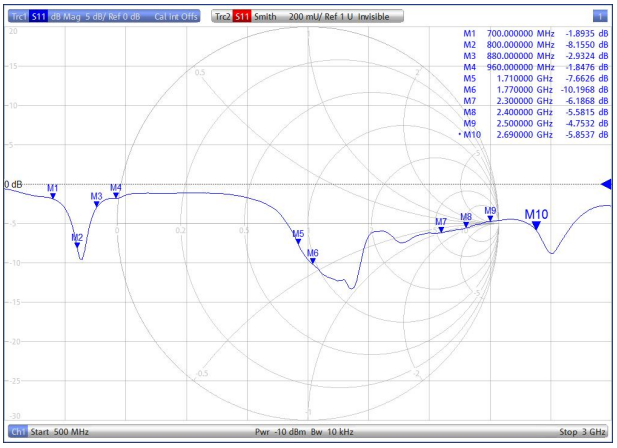
6.1 Main Ant



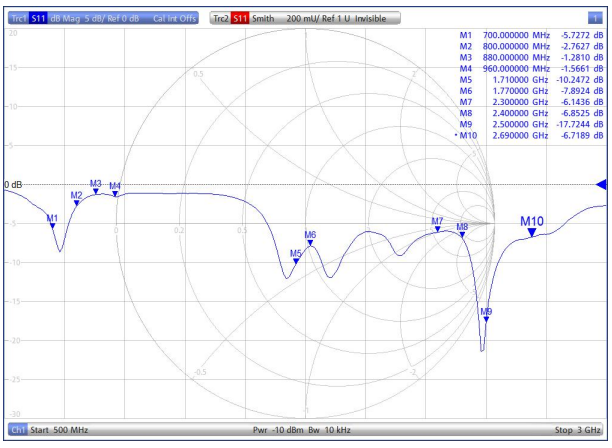
状态1



状态2

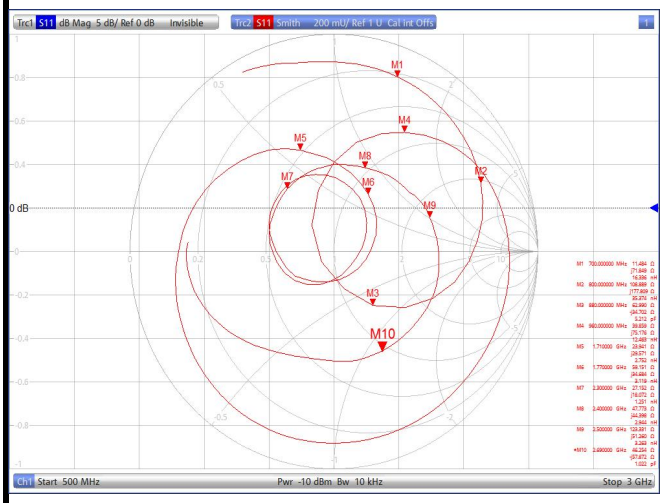


状态3

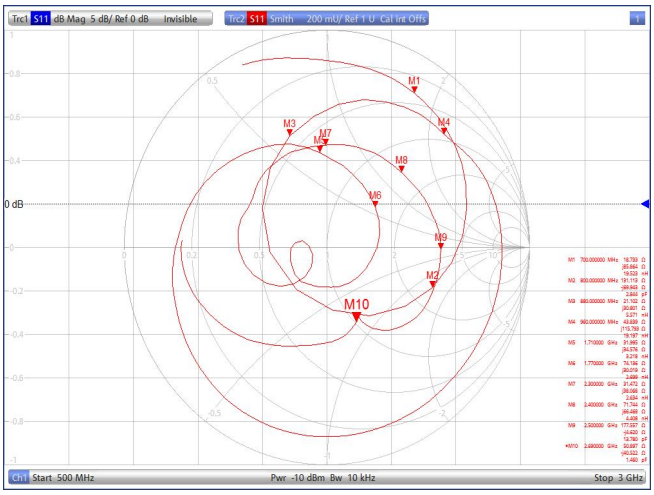


状态4

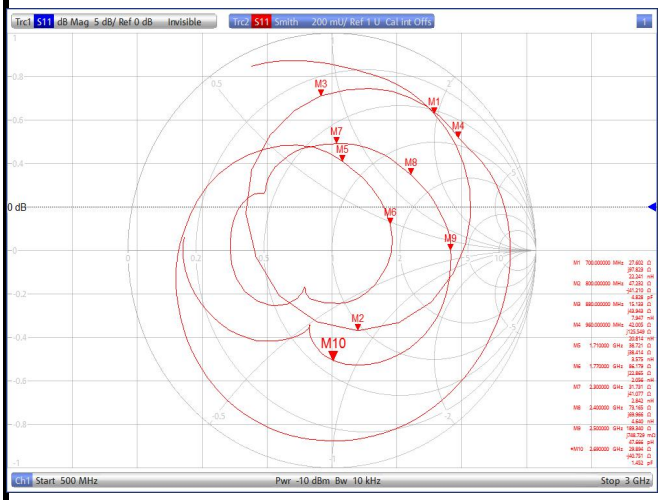
Fig.1 Return



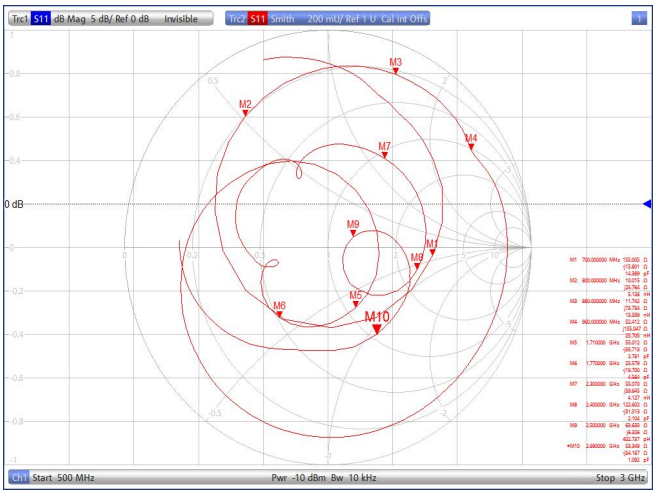
状态1



状态2



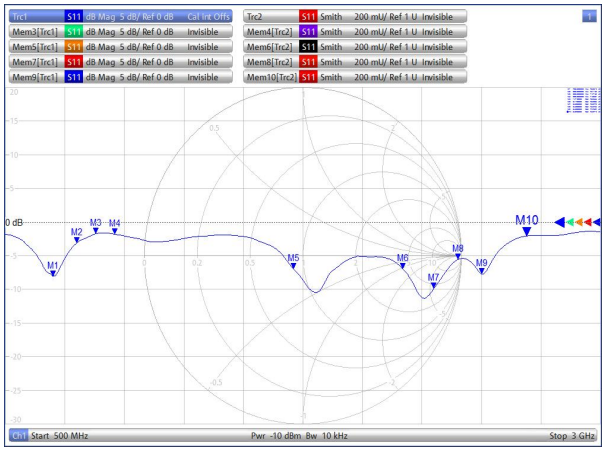
状态3



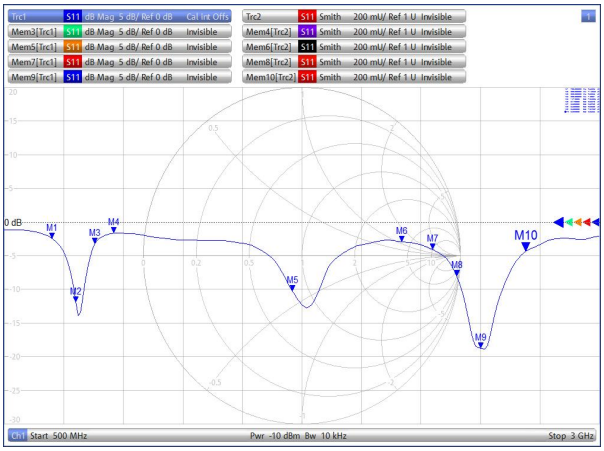
状态4

Fig.2 Smith Chart

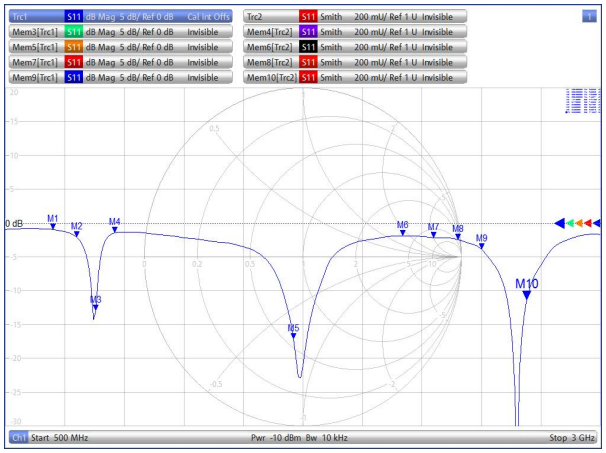
6.2 Diversity antenna



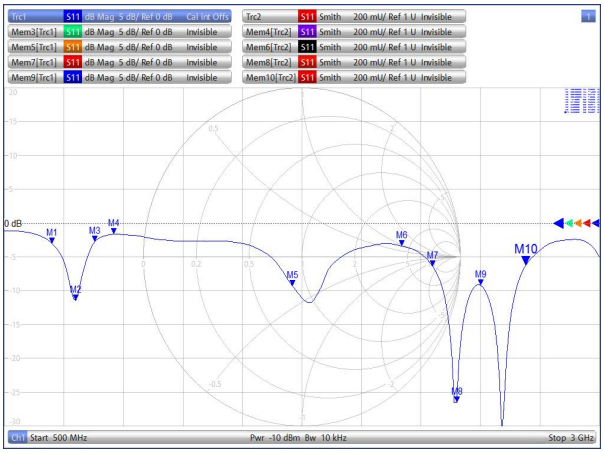
状态1



状态2

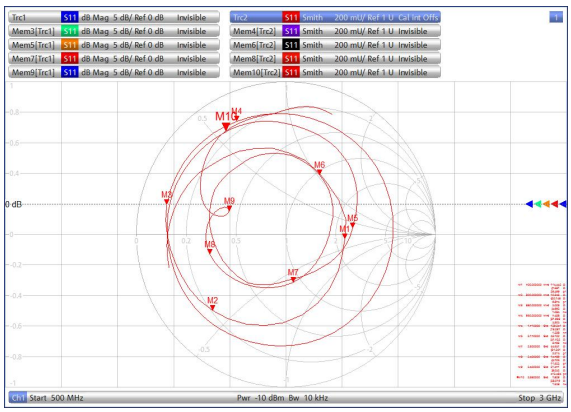


状态3

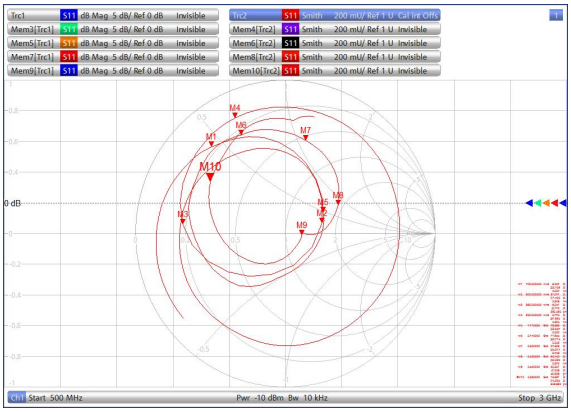


状态4

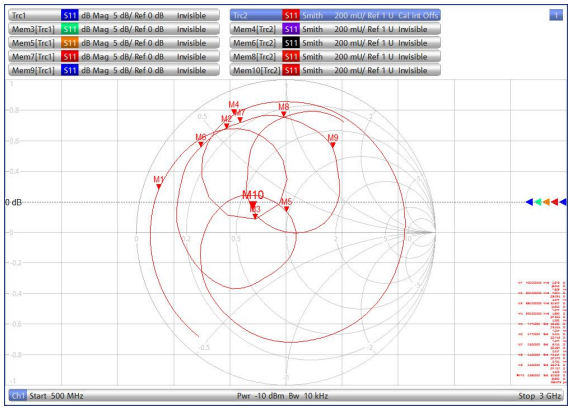
Fig.1 Return Loss



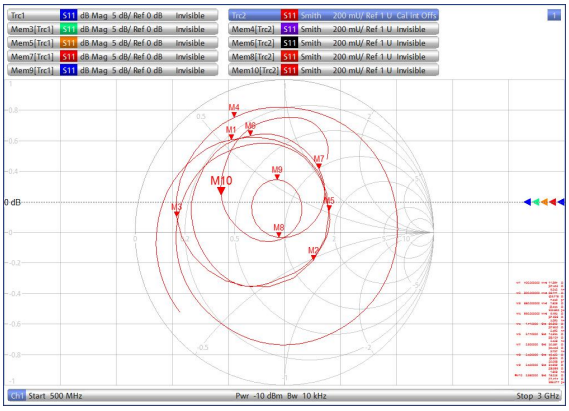
状态1



状态2



状态3



状态4

Fig.2 smith chart

6.3 GPS/BT/WIFI Ant

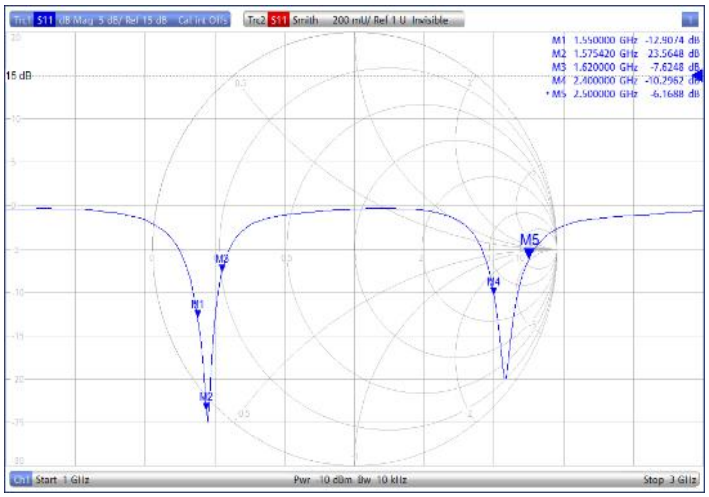


Fig.1 Return Loss

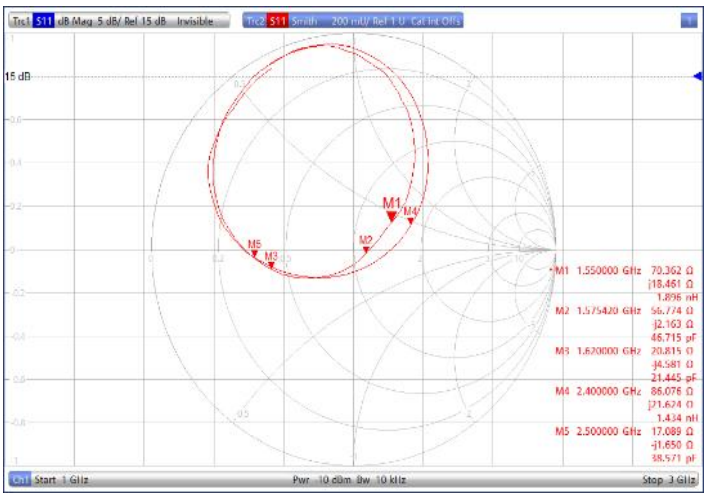
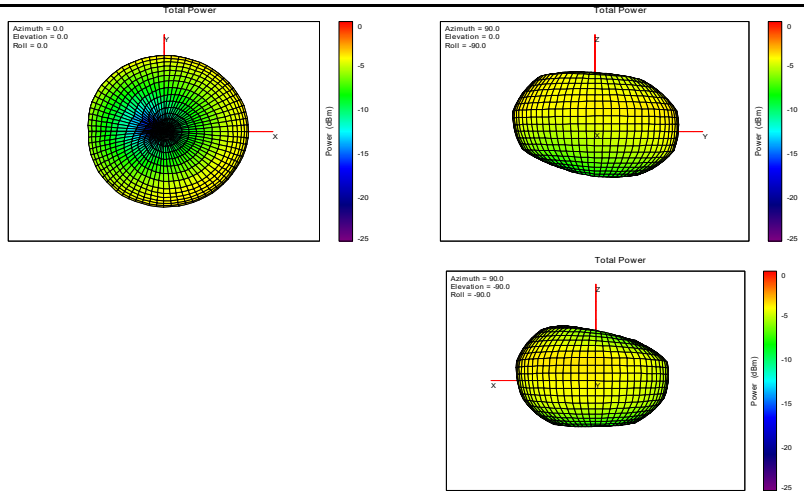
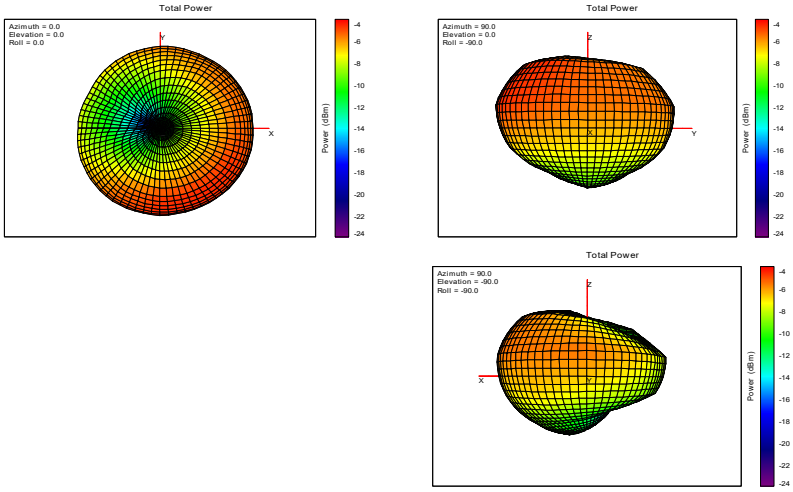
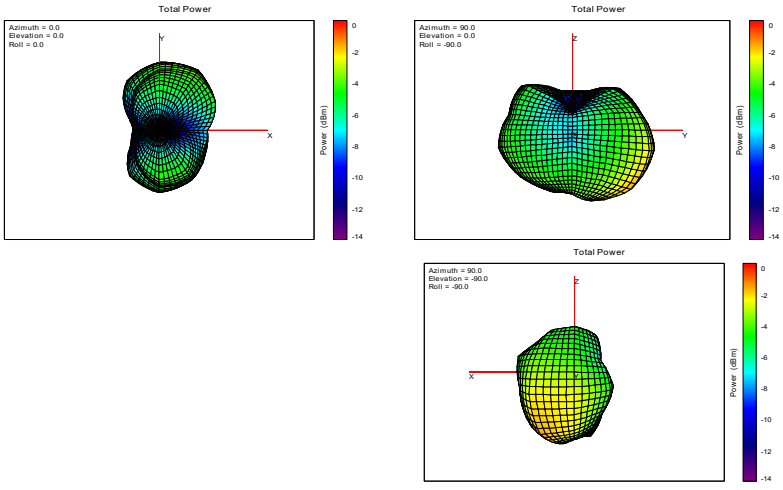


Fig.2 smith chart

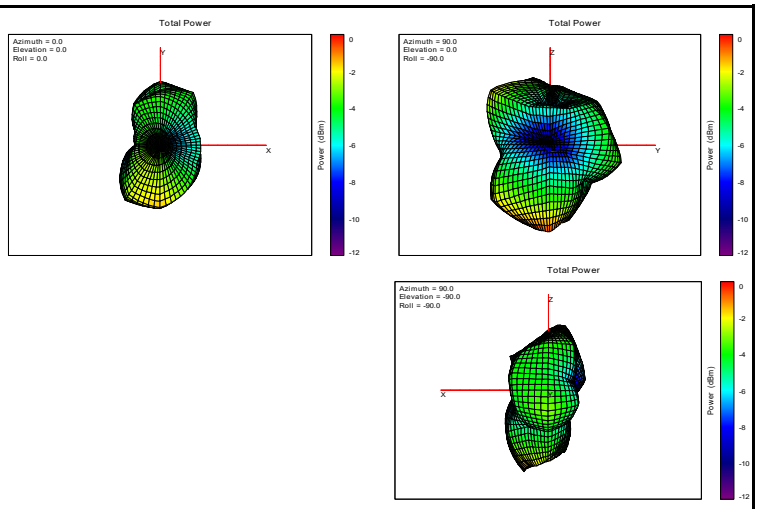
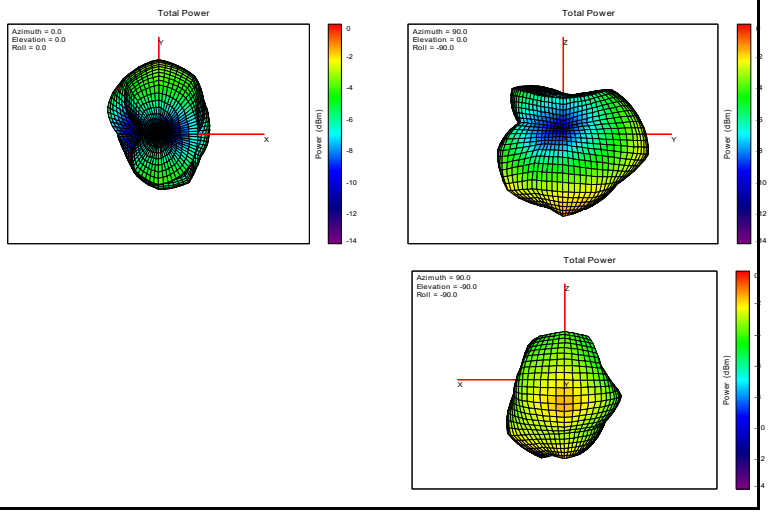
6.4 Radiation Pattern

Main ant

720MHz	
880MHz	
1710MHz	

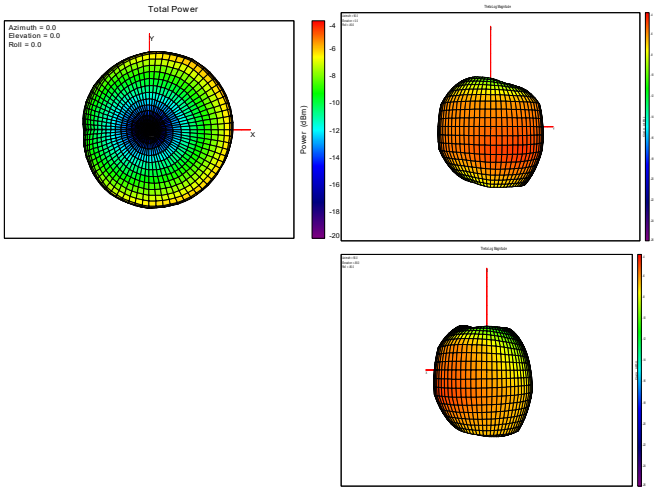
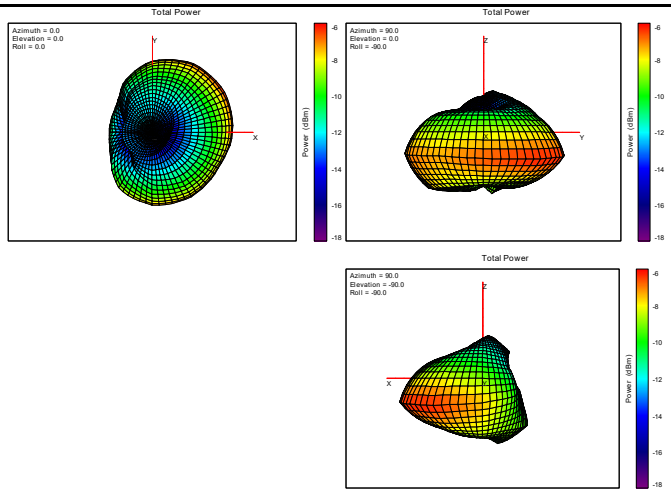
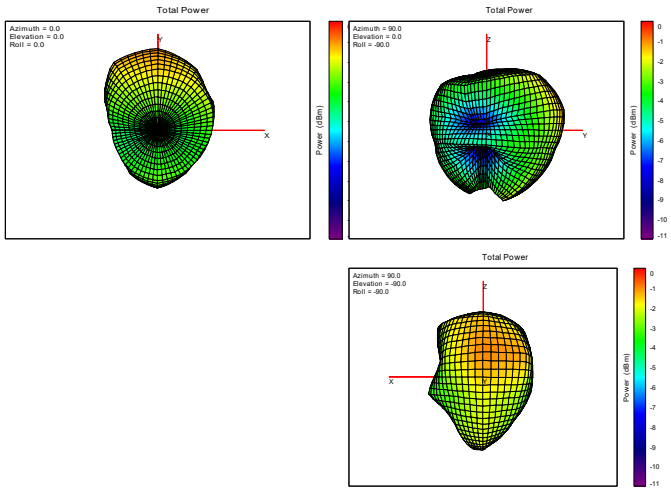
6.4 Radiation Pattern

Main ant

2100MHz	
2600MHz	

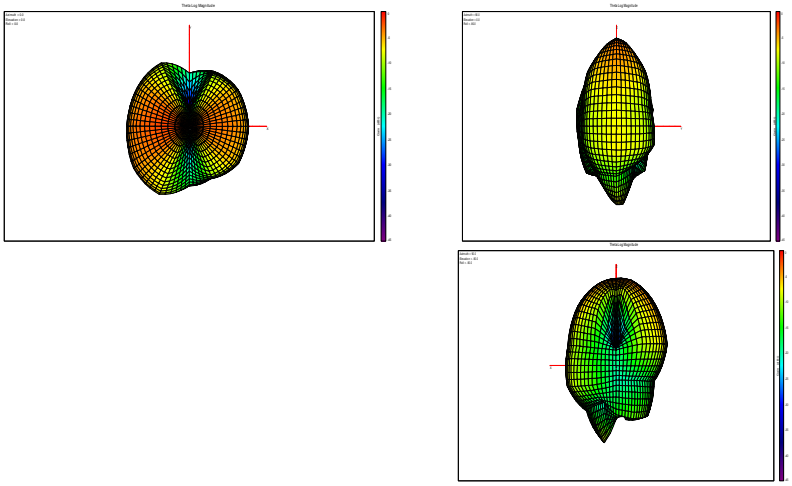
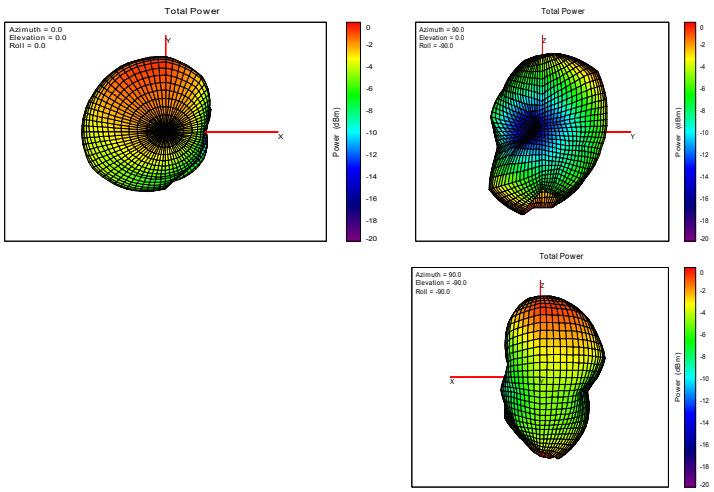
6.4 Radiation Pattern

Diversity ant

720MHz	
890MHz	
1710MHz	

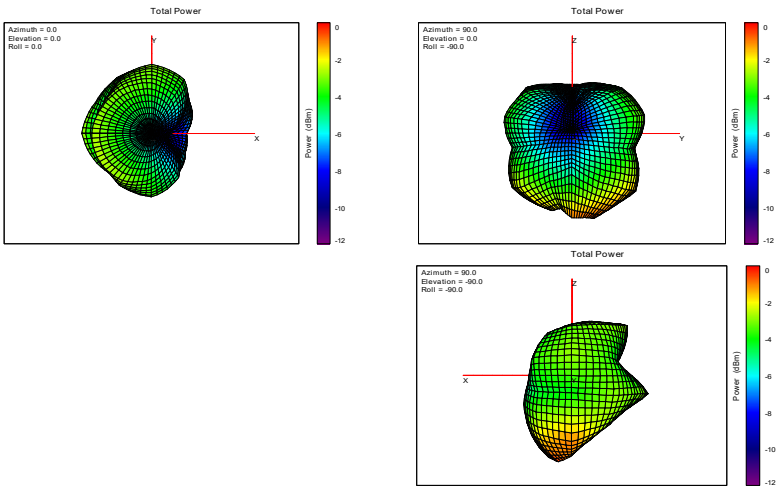
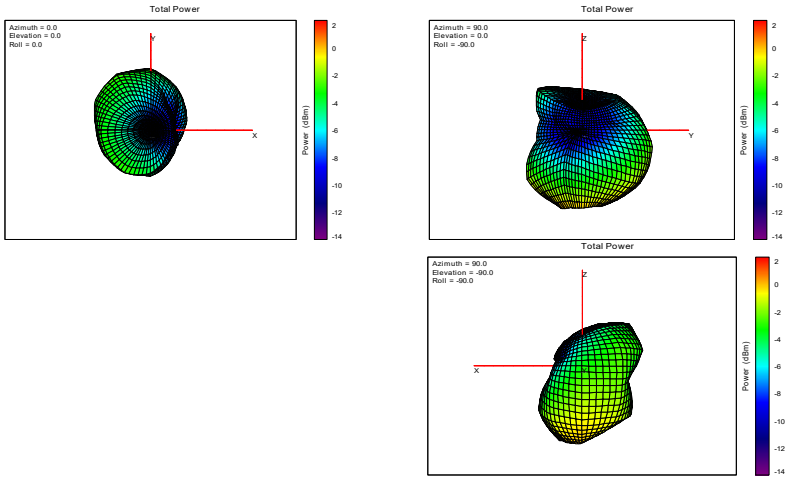
6.4 Radiation Pattern

Diversity ant

2100MHz	
2600MHz	

6.4 Radiation Pattern

GPS&wifi ant

GPS 1575MHz	
WIFI 2450MHz	

6.5 Efficiency

main ant

Fre(MHz)	Eff(dB)	Eff(%)	Peak Gain
700	-7.7	17.2	-4.6
720	-6.3	23.3	-3.7
740	-7.0	20.2	-4.3
760	-7.9	16.3	-5.2
780	-8.0	15.8	-4.8
800	-9.9	10.2	-6.8
820	-8.4	14.4	-4.7
840	-7.8	16.7	-4.4
860	-7.3	18.6	-4.2
880	-7.7	16.9	-4.3
900	-8.8	13.2	-5.3
920	-8.2	15.0	-4.7
940	-8.7	13.5	-5.1
960	-10.0	9.9	-6.3
1710	-5.6	27.7	-1.3
1730	-5.6	27.6	-1.3
1750	-5.3	29.7	-1.2
1770	-4.9	32.6	-0.7
1790	-5.1	30.7	-0.9
1810	-5.3	29.6	-1.0
1830	-5.3	29.8	-1.1
1850	-5.2	30.2	-0.9
1870	-5.3	29.8	-0.9
1890	-4.6	34.8	-0.5
1910	-4.9	32.3	-0.7
1930	-4.7	33.9	-0.3
1950	-4.7	34.3	-0.4
1970	-4.5	35.3	-0.4
1990	-4.5	35.8	-0.1
2010	-4.4	36.4	0.3
2030	-4.0	39.4	0.6
2050	-4.2	37.8	0.3
2070	-4.7	33.8	-0.4
2090	-5.2	30.1	-0.6
2110	-5.8	26.5	-0.7
2130	-5.6	27.4	0.3
2150	-5.7	27.0	0.9
2170	-5.3	29.2	1.6

Fre(MHz)	Eff(dB)	Eff(%)	Peak Gain
2190	-5.3	29.3	1.4
2210	-5.0	31.5	1.3
2230	-4.5	35.2	1.8
2250	-4.5	35.1	1.3
2270	-4.5	35.3	0.5
2290	-4.2	37.8	0.2
2310	-4.6	34.7	-0.6
2330	-4.9	32.0	-1.1
2350	-5.1	31.2	-1.5
2370	-5.3	29.8	-2.0
2390	-5.1	31.0	-1.6
2410	-5.0	31.5	-1.7
2430	-5.0	31.9	-1.6
2450	-5.6	27.7	-2.1
2470	-5.6	27.7	-2.2
2490	-5.6	27.5	-2.1
2510	-5.2	30.0	-0.9
2530	-5.2	30.3	-0.9
2550	-5.3	29.5	-1.3
2570	-5.4	28.6	-1.3
2590	-5.8	26.3	-1.9
2610	-5.9	26.0	-2.5
2630	-5.9	25.5	-2.9
2650	-6.3	23.6	-3.1
2670	-6.2	23.8	-3.3
2690	-6.2	23.7	-2.9

6.5 Efficiency

Diversity ant

Frequency (M	Eff. (Db)	Eff. (%)	Peak Gain
700	-8.4	14.5	-5.4
720	-7.6	17.2	-4.5
740	-8.3	14.9	-4.9
760	-9.2	12.0	-5.8
780	-7.8	16.8	-4.7
800	-7.7	16.9	-4.1
820	-7.2	19.0	-3.2
840	-7.9	16.3	-4.3
860	-8.1	15.4	-4.4
880	-7.1	19.5	-3.4
900	-7.6	17.3	-3.9
920	-9.7	10.7	-6.1
940	-12.1	6.1	-8.5
960	-13.9	4.0	-10.4
1710	-4.1	39.1	-0.9
1730	-4.0	40.1	-0.4
1750	-3.8	41.8	-0.2
1770	-3.7	42.8	-0.4
1790	-4.1	38.6	-0.9
1810	-4.9	32.7	-1.0
1830	-5.3	29.8	-1.4
1850	-5.9	25.9	-1.4
1870	-5.9	25.9	-1.2
1890	-5.2	30.4	-1.0
1910	-5.4	29.1	-1.4
1930	-5.1	31.0	-1.5
1950	-5.2	30.4	-1.5
1970	-5.2	30.0	-1.6
1990	-5.4	29.0	-1.8
2010	-5.4	29.0	-1.6
2030	-5.0	31.5	-1.3
2050	-5.1	30.8	-1.3
2070	-5.4	28.7	-1.5
2090	-5.6	27.8	-1.5
2110	-5.6	27.4	-1.6
2130	-5.1	30.7	-1.1
2150	-5.1	31.0	-0.7
2170	-5.0	31.7	-0.6

Frequency	Eff. (Db)	Eff. (%)	Peak Gain
2190	-5.2	30.0	-0.6
2210	-5.2	30.1	-0.6
2230	-5.0	31.4	-0.5
2250	-5.4	29.0	-0.3
2270	-5.7	26.7	-1.0
2290	-6.3	23.4	-1.1
2310	-6.6	22.0	-1.5
2330	-6.8	20.9	-1.5
2350	-6.7	21.3	-1.5
2370	-6.8	20.8	-2.1
2390	-6.6	21.9	-2.0
2410	-6.5	22.1	-2.0
2430	-6.7	21.5	-1.8
2450	-7.7	17.2	-2.7
2470	-8.0	15.7	-3.1
2490	-7.1	19.3	-2.2
2510	-6.8	21.1	-1.5
2530	-6.3	23.4	-0.9
2550	-5.9	25.5	-0.6
2570	-5.6	27.5	-0.4
2590	-5.4	29.1	-0.1
2610	-5.0	31.5	0.2
2630	-4.8	33.5	0.7
2650	-5.0	32.0	0.8
2670	-4.9	32.1	1.0
2690	-5.1	31.0	1.1

6.5 Efficiency

GPS/WIFI

Frequency/MHZ	Eff(dB)	Eff(%)	Gain (dB)	Upper Hem. Total Radiated Pwr (dBm)
1550	-4.6	34.6	-1.1	-5.0
1560	-4.2	37.8	-0.4	-4.7
1570	-4.3	36.8	-0.4	-4.9
1580	-4.5	35.4	-0.7	-5.2
1590	-4.8	33.5	-0.6	-5.6
1600	-4.9	32.1	-1.1	-5.9
1610	-4.9	32.3	-0.8	-6.1
1620	-4.8	32.8	-0.7	-6.0
2400	-6.0	25.2	-0.6	-7.1
2410	-5.6	27.7	-0.4	-6.7
2420	-5.2	30.2	0.0	-6.3
2430	-4.9	32.5	0.5	-5.9
2440	-4.9	32.7	0.5	-5.9
2450	-5.2	30.4	0.0	-6.2
2460	-5.2	30.3	0.1	-6.2
2470	-5.1	30.6	0.2	-6.1
2480	-5.2	30.5	0.0	-6.1
2490	-5.2	30.3	-0.1	-6.1
2500	-5.2	30.3	-0.2	-6.1

7.Active Measurement Data

BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
GSM850	128	23.1	-105.2	DCS1800	512	23.9	-107.3
	190	24.6	-105.4		699	24.8	-107.6
	251	25.0	-102.8		885	24.3	-106.6
GSM900	975	21.3	-104.6	PCS1900	512	25.1	-106.5
	38	23.2	-105.2		661	24.8	-106.8
	124	24.0	-103.4		810	24.9	-106.2
BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
WCDMA B1	9612	18.8	-110.4	WCDMA B5	4132	14.5	-107.3
	9750	18.6	-110.6		4183	15.0	-107.8
	9888	18.3	-109.2		4233	15.5	-106.0
WCDMA B2	9262	18.4	-109.8	WCDMA B8	2712	12.7	-105.7
	9400	18.3	-110.2		2788	14.3	-106.6
	9538	18.8	-109.4		2863	15.4	-105.5
WCDMA B4	1312	17.6	-109.1				
	1413	18.2	-108.5				
	1513	18.2	-108.9				

7.Active Measurement Data

BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
LTE B1 (10M)	18050	18.9	-97.4	LTE B38 (20M)	37850	16.9	-93.0
	18300	18.6	-97.3		38000	17.3	-92.5
	18550	18.4	-96.4		38150	17.2	-92.0
LTE B2 (10M)	18650	18.3	-97.2	LTE B40 (20M)	38750	17.5	-92.3
	18900	18.1	-96.9		39150	18.4	-93.2
	19150	18.5	-97.0		39550	17.4	-91.9
LTE B3 (10M)	19250	17.4	-97.2	LTE B41 (20M)	39750	17.2	-91.9
	19575	18.2	-97.6		40620	17.2	-92.8
	19900	17.4	-96.5		41490	17.5	-90.7
LTE B4 (10M)	20000	17.4	-95.7	LTE B13 (10M)			
	20175	18.1	-95.7		23230	15.6	-93.1
	20350	17.9	-96.7				
LTE B5 (10M)	20450	14.1	-93.4	LTE B26 (5M)	26715	15.2	-94.2
	20525	14.8	-94.2		26865	16.4	-94.1
	20600	15.4	-93.7		27015	15.7	-94.6
LTE B7 (10M)	20850	17.2	-93.2	LTE B66 (10M)	132022	18.5	-94.5
	21100	17.1	-92.9		132322	18.4	-94.7
	21350	17.1	-93.7		132622	18.3	-94.9
LTE B8 (10M)	21500	12.4	-94.1				
	21625	14.1	-93.9				
	21750	15.2	-92.0				
LTE B28 (10M)	27260	12.7	-93.7				
	27410	14.7	-92.5				
	27610	15.8	-91.8				

7.Active Measurement Data

BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
GSM850	128	23.3	-105.4	DCS1800	512	23.0	-107.8
	190	23.5	-105.4		699	24.5	-107.9
	251	23.6	-103.0		885	24.8	-106.6
GSM900	975	23.7	-102.7	PCS1900	512	25.4	-106.2
	38	24.3	-103.4		661	25.9	-106.7
	124	24.9	-101.4		810	25.4	-106.0
BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
WCDMA B1	9612	17.8	-109.4	WCDMA B5	4132	14.3	-107.1
	9750	17.6	-109.5		4183	15.0	-107.5
	9888	17.4	-108.2		4233	15.9	-106.1
WCDMA B2	9262	18.5	-109.3	WCDMA B8	2712	14.2	-104.6
	9400	18.1	-109.7		2788	15.8	-105.1
	9538	17.9	-109.3		2863	16.4	-103.9
WCDMA B4	1312	16.6	-108.5				
	1413	17.7	-107.8				
	1513	18.3	-108.3				

7.Active Measurement Data

BAND	CH	TRP	TIS	BAND	CH	TRP	TIS
LTE B1 (10M)	18050	17.8	-96.4	LTE B38 (20M)	37850	18.1	-89.5
	18300	17.6	-96.6		38000	17.5	-88.9
	18550	17.4	-95.6		38150	16.9	-88.4
LTE B2 (10M)	18650	18.4	-96.8	LTE B40 (20M)	38750	18.2	-91.5
	18900	18.1	-97.4		39150	18.6	-92.5
	19150	17.8	-97.1		39550	18.0	-90.9
LTE B3 (10M)	19250	16.5	-97.4	LTE B41 (20M)	39750	19.5	-87.6
	19575	18.0	-97.9		40620	17.8	-88.4
	19900	18.5	-96.8		41490	15.0	-86.5
LTE B4 (10M)	20000	16.6	-94.5	LTE B13 (10M)			
	20175	17.7	-94.8		23230	14.5	-93.1
	20350	18.1	-95.8				
LTE B5 (10M)	20450	14.0	-92.9	LTE B26 (5M)	26715	15.5	-94.2
	20525	14.9	-93.7		26865	16.3	-94.1
	20600	16.0	-92.7		27015	15.9	-94.6
LTE B7 (10M)	20850	19.6	-91.2	LTE B66 (10M)	132022	17.7	-94.5
	21100	19.0	-90.7		132322	17.6	-94.7
	21350	18.6	-91.3		132622	17.7	-94.9
LTE B8 (10M)	21500	14.0	-93.9				
	21625	15.7	-94.2				
	21750	16.3	-92.2				
LTE B28 (10M)	27260	12.9	-95.2				
	27410	14.5	-93.8				
	27610	14.5	-92.9				

7.Active Measurement Data

GPS/BT/WIFI ant

BAND	CH	TRP	TIS
		11M	11M
B	1	11.95	-81.13
	7	13.41	-82.39
	13	13.33	-82.48
		6M	54M
G	1	10.86	-68.21
	7	12.13	-69.63
	13	12.09	-69.47

GPS	
TIS	-152.2
TICN	41.6
UHIS	-148.9

8. Antenna measurement spec on RF test jig

Test band	Reference frequency(MHz)	Spec(MHz)
MAIN	952 / 1067	±15
	1946 / 2622	±25
	3078 / 3499	±35
DIV	981 / 1028	±15
	2185 / 2240	±25
GPS & WIFI2.4G	1636 / 1738	±15
	2930 / 3101	±25